COLOCALISATION OF THE PROTEIN TYROSINE PHOSPHATASES PTP-SL AND PTPBR7 WITH β4-ADAPTIN IN THE GOLGI APPARATUS AND ENDOSONMES IN NEURONAL CELLS.

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ABSTRACT
Reversible tyrosine phosphorylation is an important mechanism in the development and function of the central nervous system. The neuronal protein tyrosine phosphatases PTP-SL and PTPBR7, which differ only in the length of their N-terminal domain, are derived from the mouse Ptprr gene by the use of two alternative promotors. PTPBR7 is expressed during early embryogenesis in spinal ganglia cells as well as in developing Purkinje cells. Postnatally, PTPBR7 is expressed in various regions of the adult mouse brain, but expression in Purkinje cells has ceased and is replaced by the PTP-SL-specific transcript. PTP-SL is a membrane-associated phosphatase, whereas PTPBR7 is a type I transmembrane protein [1].
We found that the phosphatase domain of PTP-SL and PTPBR7 interacts with the β4-adaptin of the AP4 complex, an important component of the vesicular transport machinery, in the yeast two-hybrid system. Immunohistochemical analysis demonstrated that PTP-SL, PTPBR7 and β4-adaptin are all endogenously expressed in brain. Both immunofluorescence and immunoelectron-microscopy studies using transiently transfected neuroblastoma cells further revealed that PTP-SL and β4-adaptin display a similar subcellular distribution and are localised at the Golgi apparatus and additionally at vesicles throughout the cytoplasm which are, at least in part, from endocytotic origin [2]. Based on these data, we suggest that reversible tyrosine phosphorylation may regulate a vesicular transport route from the Golgi apparatus to endosomes, a pathway in which the AP4 complex is also involved.
Recently we generated cell lines which stably express GFP tagged versions of PTP-SL or PTPBR7 under the control of an inducable promotor (TEToff). These cell lines are currently used the further analyse the exact nature of the vesicles to which these phosphatase are localised in living cells.

REFERENCES